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## MILITARY AFFAIRS

### U.S. "STEALTH" PROGRAM DISCUSSED

Moscow VESTNIK PROTIVOVOZDUSHNOY OBORONY in Russian, No 3, Mar 83, pp 84-85

Article by Major V. Ionov: "On the Program to Design 'Invisible' Aircraft"  
[According to information from the foreign press]

[Text] Recently, the aggressiveness of the foreign policy and the magnitude of military preparations of American imperialism have increased sharply. A great deal of attention in the United States is devoted to expanding its aviation capabilities in order to overcome the air defenses of the Warsaw Pact countries. To achieve this goal, the United States is conducting work on the "Stealth" program, which is attempting to develop methods that would substantially complicate detection of aircraft through air defense means using the principles of radio location or heat-seeking.

The "Stealth" aircraft development program is being conducted by a number of large U.S. aerospace firms. A contract for 7.3 billion dollars for designing the future strategic ATF bomber was granted to the Northrop Corporation. The Lockheed Company, using the experience it gained in designing the SR-71 and A-11 aircraft, is at present building 29 reconnaissance aircraft which have received the designation CSIRS. Their construction is being financed by the project for designing the future ATF fighter aircraft. The Boeing, Grumman and Vought companies are also participating in this work. In fiscal year 1982 alone the United States spent nearly one billion dollars on this developmental work.

Despite the fact that details of the "Stealth" technology are classified, the basic principles of this concept have been widely discussed in the foreign press.

The first of these principles involves decreasing the geometric size of the aircraft with the purpose of lowering electronic paramagnetic resonance (EPR) and developing aerodynamic forms of the fuselage, wing and engine air intakes that would make radar signals be reflected away from their source. In order to do this, sharp-edged protrusions on the outside of the aircraft are being replaced by smooth contours; and engines, systems and other on-board equipment are being placed within the fuselage.

The second principle involves the use of radar absorbing materials: Plastic polymers for the exterior coating of aircraft bodies, and carbon-containing

or ceramic materials for other aircraft components; the use of heat insulation materials which would lessen the infrared radiation of the engine; and engine exhaust pipes of a special form that would complicate the operations of heat-seeking locators.

These measures will noticeably decrease the distance at which an aircraft can be detected. Decreasing the energy of the reflected radar signal by 12 db will lower the detection distance by 50 %, and if the signal is weakened by 20 db, the distance will decrease by nearly two-thirds.

An important role is being given to improving existing and developing new, active and passive methods of radio electronic warfare. For example, if the enemy's radar frequency is determined with the aid of on-board equipment, the signals would be delayed and re-emitted, thereby causing errors in radar calculations. The reflected signal would be interpreted by the radars as if it had come from a target located at a significantly greater distance than is really the case. The British Ferranti Company has developed an IMP system of radio-technical location that determines the operating zone of enemy radar with the aid of supersensitive transducers having a 360 field of vision and reflects such data with the aid of an on-board computer on a display screen. This type of apparatus, according to foreign experts, decreases even further the probability of detecting an aircraft when an optimal route and flight profile in radar zones is not taken by the aircraft.

There are differing opinions with regard to the tactics of "Stealth" aircraft in breaking through an air defense system. Some experts believe that such aircraft will not have to penetrate the enemy air defense zone at low altitude; at medium and high altitudes they will be, from an aerodynamic viewpoint, more effective, which will assure a significantly greater flight range with an identical fuel supply. However, other projects have been looked at recently involving penetration of the air defense system, for the most part at low altitudes.

The Northrop Corporation's ATV bomber is being designed as a "flying wing," which provides a higher relative weight for armament, in comparison with an aircraft having the usual aerodynamic design, because the aircraft weight is distributed along the entire wingspan. In connection with this, and due to lower requirements for a maximum load and maneuverability, the load-bearing strength of the aircraft will be fairly light. In developing this aircraft, the company is using experience it acquired at the end of the 1940's in connection with the design of the B-35 and B-49 bombers (Fig. 1), constructed as "flying wings" and using relatively small vertical stabilizers. For comparison, Fig. 2 shows one of the 1979 "Stealth" projects of the Boeing Company.

Plans call for the Northrop Company aircraft to be smaller in size than the B-1B bomber and to carry a somewhat smaller combat load, which basically includes highly accurate bombs of various size. The engines will be located in the central part of the wing.

The Lockheed Company's CSIRS aircraft, according to the foreign press, is similar to or somewhat smaller than the F-18 "Hornet" fighter aircraft. It

has one engine and tail rudders that are inclined inwards. In design, the aircraft has a delta-shape with exceptionally smooth contours, and constitutes a flying platform that is carrying a box-shaped compartment. A diagram of the aircraft, based on analyses of foreign specialists, is shown in Fig. 3.

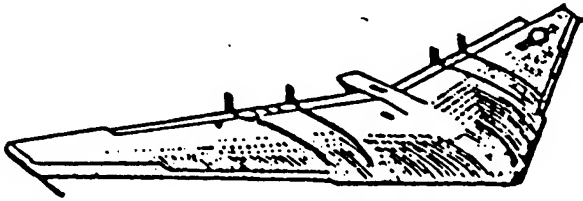


Fig. 1



Fig. 2

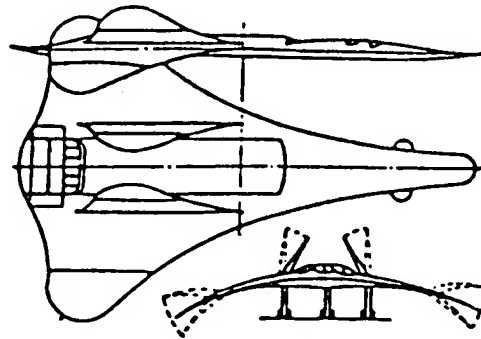


Fig. 3

The engine air intake is located at the top of the fuselage, behind the cockpit. Although this placement does not provide enough air for the engine at large angles of attack, it is still enough for a normal functioning of the engine, due to an intensive air flow turbulence that comes from the leading edge of the wing and hugs the fuselage. The exhaust gases apparently mix with the air from the second contour of the engine in order to cool them, and this provides a decrease in the intensity of heat radiation. As a result, there is a decrease in the distance at which the target can be detected by the heat-seeking warheads of missiles.

According to American military experts, the development and deployment of "Stealth" aircraft will greatly increase the surprise use of aircraft, because of a sharp decrease in the distance at which they can be detected, and it will also decrease the effectiveness of anti-aircraft guided missiles, (ZUR), because of the decrease in the EPR and an increase in fluctuating errors when aiming missiles. Shortcomings of such aircraft include a certain decrease in aerodynamic characteristics, a relatively small combat load because of the presumed absence of external pods, as well as a limitation in using navigational systems for operational activities and communications.

Although research in the "Stealth" program, judging from Western press reports, is still in the experimental stage, the United States is already trying to determine future uses for "Stealth" technology in designing new types of tactical fighter aircraft, reconnaissance aircraft, and various unmanned systems and winged missiles. The main attention of the American administration, however, is directed toward the development of strategic bomber aviation.

In accordance with the modernization plan for the strategic forces of the United States Air Force, serial production is being planned for the ATV bombers in 1988-1989, immediately following the completion of the planned production of 100 Rockwell B-1B bombers. The ATV aircraft will be rigorously tested in the process of B-1B production. Thus, the B-1B bomber fulfills two functions: It is an intermediary strategic aircraft for penetrating the air defenses of a probable enemy, and it serves as a guarantee in the event of failure of the "Stealth" concept.

If the ATV bomber is developed successfully, it can be deployed in 1991. In that case, some 100 of these aircraft will be accomplishing missions of penetrating air defenses instead of the B-1B bombers, which would then be used only as carriers for winged missiles to be released outside the air defense zone of the enemy.

The program for designing an "invisible" aircraft is another example of the unrestrained attempts by aggressive circles in the United States to achieve military superiority over the Soviet Union.

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CSO: 8144/1213